



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

THE JOURNAL OF PHILOSOPHY

PSYCHOLOGY AND SCIENTIFIC METHODS

THE RELATIVE MEMORY VALUES OF DUPLICATION AND VARIATION IN ADVERTISING

THE investigation to be described in this paper is a continuation of one recently published entitled, "The Relative Importance of Size and Frequency in Forming Associations."¹ In that paper, the relative memory values of a full-page advertisement shown once, a half-page shown twice, a quarter-page shown four times, and an eighth-page shown eight times were determined. In all cases where an advertisement appeared more than once, exact duplicates were used.

The question then arose, which has the greater memory value, two or more duplications of the same advertisement, or two or more advertisements of the same commodity, each advertisement differing from the other either in picture, or in wording, or in both? The following experiment was devised to test this point.

Two dummies were prepared, one of which contained advertisements which when repeated were duplicates. The other consisted of different advertisements of the same commodity, but the advertisements were variations, not duplicates. The first dummy, in which duplicates were used, was made up as follows:

4 full-page advertisements appeared once.
4 full-page advertisements appeared twice.
4 full-page advertisements appeared 4 times.

4 half-page advertisements appeared once.
4 half-page advertisements appeared twice.
4 half-page advertisements appeared 4 times.

4 quarter-page advertisements appeared once.
4 quarter-page advertisements appeared twice.
4 quarter-page advertisements appeared 4 times.

¹ This JOURNAL, Vol. XII., pages 477 ff.

The second dummy was made up in the same way, variations of advertisements of the same commodity being used instead of duplicates. The advertisements were all the size of those contained in the *Saturday Evening Post*. The same subjects, 40 in number, were used in both tests. It is frankly acknowledged that too few subjects were employed, but since the results agree so closely with those of others who have investigated the first part of the problem, it is believed that a publication of our findings is warranted.

Each subject was handed one of the dummies and was told to look it over at his leisure, turning each page of the advertising section. The average time taken by each subject with each dummy was about 10 minutes. After finishing with the dummy, he was instructed to write down all that he could remember about the advertisements which he had seen. One week or more afterwards, he was handed the other dummy and given the same instructions. Half of the subjects started with the dummy containing duplicates; the other half with the dummy containing variations.

RESULTS

The results obtained from the first dummy are presented in the table below. The figures show the total number of credits received by each form of presentation of the material. Since in both dummies certain advertisements were shown but once, the average of the results was used to determine the value of the advertisements shown but once:

	Once	Twice	4 Times
Quarter page.....	16	26	45
Half page.....	32	37	83
Full page.....	47	80	108

If the quarter page shown once is considered the standard of stimulation, the half page shown once and the quarter page twice represent a doubling of the stimulation. Were both repetition and increase in size of equal value, the figures for the half page appearing once and the quarter page appearing twice should be the same, but they are not, indicating rather that size is a more important factor than repetition. This point will shortly be considered more in detail. Similarly, the full page shown once, the half page shown twice, and the quarter page shown four times represent four times the amount of stimulation. The full page shown twice and the half page shown four times are eight times the standard stimulus and the full page shown four times is sixteen times the standard.

If the table given above is reduced to ratios, the quarter page appearing once being taken as the standard, the following table is obtained:

	Once	Twice	4 Times
Quarter page.....	1.00	1.62	2.82
Half page.....	2.00	2.32	5.19
Full page.....	2.94	5.00	6.76

If, from this table, another one is prepared, showing the effect of constantly doubling the amount of stimulation, the following is obtained :

Units of Stimulation				
1	2	4	8	16
1.00	2.00 1.62	2.94 2.32 2.82	5.00 5.19	6.76
Average.....1.00	1.81	2.69	5.10	6.76

These ratios vary approximately as the 1.35 root of the amount of the stimulus.

The differences in memory value between repetition and size have been disregarded in the tables so far. The table given below shows the effect upon memory of increasing size. The quarter page, no matter whether it is presented once, twice, or four times, is considered as the standard, and the half- and full-page values are reduced to ratios of the quarter page.

	Quarter	Half	Full
Once.....	1.00	2.00	2.94
Twice.....	1.00	1.42	3.08
4 times.....	1.00	1.84	2.40
Average.....	1.00	1.76	2.80

These ratios vary approximately as the 1.3 root of the number of presentations or amount of stimulation, the 1.3 root of 1 being 1, of 2 approximately 1.70, and of 4 about 2.9.

Before trying to establish correlations between these results and those of other investigators, I shall present the rest of my material. When all the data are at hand, definite relations will be easier to establish.

Turning now to a consideration of the effects of frequency of insertion, we regard one presentation of the material as the standard and reduce the other values to ratios of it. The table showing these ratios follows:

	Once	Twice	4 Times
Quarter page.....	1.00	1.63	2.81
Half page.....	1.00	1.16	2.60
Full page.....	1.00	1.70	2.30
Average.....	1.00	1.49	2.57

Here we find that the ratios vary approximately as the 1.6 root of the number of presentations.

The conclusion which we are forced to accept by this part of the experiment is that size is of more importance in the formation of associations than repetition. This point will be considered more in detail at a later period.

With the second dummy, which was made up of varied advertisements of the same commodity where repetition was necessary, the following totals were received by each of the different arrangements:

	Once	Twice	4 Times
Quarter page.....	16	46	85
Half page.....	32	86	117
Full page.....	47	108	149

Reducing this table to ratios of one presentation of the quarter page, as was done with the other dummy, we obtain the following:

	Once	Twice	4 Times
Quarter page.....	1.00	2.88	5.31
Half page.....	2.00	5.37	7.31
Full page.....	2.94	6.75	9.31

Another table, showing the effects of repeatedly doubling the amount of stimulation, follows:

Units of Stimulation				
1	2	4	8	16
1.00	2.00 2.88	2.94 5.37 5.31	6.75 7.31	9.31
Average..... 1.00	2.44	4.54	7.03	9.31

These figures do not follow an X^n curve. But they do indicate quite forcibly that variability is a more important consideration than duplication in advertising.

Turning now to the consideration of the effect of size, the following table gives the ratios, considering the quarter page as the standard:

	Quarter	Half	Full
Once.....	1.00	2.00	2.94
Twice.....	1.00	1.84	2.35
4 times.....	1.00	1.38	1.76
Average.....	1.00	1.74	2.35

These figures agree fairly well with the results obtained from the dummy containing duplicates, giving, however, a slightly lower ratio for the full page. The average of the two is given below:

	Quarter	Half	Full
Duplicates.....	1.00	1.76	2.80
Variations.....	1.00	1.74	2.35
Average.....	1.00	1.75	2.58

A comparison of these results with those of other experiments will now be made. Scott² found the following ratios, his results being uncorrected for familiarity:

	Quarter	Half	Full
Recognition.....	1.00	2.32	3.74
Recall.....	1.00	2.52	5.53
Average.....	1.00	2.42	4.64

His general conclusion is that there is a more than proportionate increase in memory value with increase in size of the advertisements.

Starch³ gives the following figures. Where the ratios representing the memory value are uncorrected for familiarity he obtained the first set of ratios; where correction was made for familiarity, he obtained the second set of values:

Quarter	Half	Ful	Two Pages
1.00	2.43	5.23	6.98
1.00	1.77	3.44	4.41

Starch's results agree with Scott's in that, when uncorrected for familiarity, they show a more than proportionate increase in memory value with increase in the amount of space used. Where familiarity is allowed for, however, the ratios show a less than proportionate increase.

Strong⁴ gives the results of several experiments, showing the effect of increasing space. His ratios follow:

² Scott, W. D. "The Psychology of Advertising," pages 168-169.

³ Starch, D. "Advertising," pages 30 and 48.

⁴ Strong, E. K. *Psychol. Rev.*, Vol. 21, pages 137 ff.

	Quarter	Half	Full
(A).....	1.00	1.41	2.15
(B).....	1.00	1.11	1.13
(C).....	1.00	2.39	3.65
(D).....	1.00	1.53	2.34
(E).....	1.00	1.66	2.41
Average.....	1.00	1.62	2.34

Strong's results indicate a less than proportionate gain in memory value with increase in size in all cases but one.

If we take the results of all of these investigations and average the ratios, it may bring out an approximate truth. In averaging the ratios, all of the experiments will be considered to be of equal value, no allowance being made for the greater number of subjects used in certain of the experiments. The ratios are given below:

	Quarter	Half	Full
Scott.....	1.00	2.32	3.74
Scott.....	1.00	2.52	5.53
Starch.....	1.00	2.43	5.23
Starch.....	1.00	1.77	3.44
Strong.....	1.00	1.41	2.15
Strong.....	1.00	1.11	1.13
Strong.....	1.00	2.39	3.65
Strong.....	1.00	1.53	2.34
Strong.....	1.00	1.66	2.41
Adams.....	1.00	1.76	2.80
Adams.....	1.00	1.74	2.35
Average.....	1.00	1.87	3.16

These ratios for the half- and full-page spaces are undoubtedly higher than they should be. For in four of Strong's experiments, in one of Starch's, and in Scott's there is little if any selection of the advertisements used. The general scheme was to use the advertising section of some current magazine as the material in the experiment. The greater familiarity of the half-page and especially of the full-page advertisements undoubtedly raised the ratios for those sizes somewhat above the normal memory value. For in advertising, as elsewhere, there is a natural selection going on, so that the full pages tend to represent those firms which have advertised successfully for some little time. The mere fact of familiarity gives to these advertisements all the value to be derived from repetition, either from duplicated advertisements, or, more probably, from varied advertisements. We shall see below that variation in the form of presentation is a very important principle in relation to memory value.

If we accept Starch's⁵ method of allowing for familiarity, we

⁵ Starch, D. "Advertising," page 34.

find that the quarter page should be allowed 100 per cent., the half page 73 per cent., the full page 63 per cent., and the two page 62 per cent. of the values actually received. Reducing the half-page and the full-page values by these amounts in the seven experiments mentioned above, we obtain the following ratios.

	Quarter	Half	Full
Scott.....	1.00	1.69	2.36
Scott.....	1.00	1.84	3.50
Starch.....	1.00	1.77	3.44
Strong.....	1.00	.81	.71
Strong.....	1.00	1.74	2.30
Strong.....	1.00	1.13	1.48
Strong.....	1.00	1.21	1.52
Average.....	1.00	1.46	2.20

Taking the other series of experiments, in which the advertisements were selected to avoid undue familiarity, though the values were undoubtedly somewhat affected by it, we obtain the following set of ratios:

	Quarter	Half	Full
Strong.....	1.00	1.41	2.15
Adams.....	1.00	1.76	2.80
Adams.....	1.00	1.74	2.35
Average.....	1.00	1.64	2.43

A word should be said in explanation of the differences which exist between Strong's results and ours. In the first place, our advertisements were possibly slightly more familiar than his. In the second place, the time intervals in the two experiments were different. Strong presented his duplicated advertisements one month apart and tested a month later. In our experiment, the successive presentations of the material occurred within a space of 10 minutes and the test followed immediately after. The effect of this should be to raise our values somewhat,⁶ since our averages are made from one, two, and four presentations of the material.

The reason for going into so much detail in connection with the influence of space is because we wish to obtain some definite data which may be used in making a comparison between the experimental results and those obtained in actual advertising business. The business returns were obtained from Shryer's "Analytical Ad-

⁶ Strong, E. K. *Psychol. Rev.*, Vol. 21, page 147, footnote.

"From data now being accumulated we find that shorter intervals, as one week, give ratios indicating a greater effect from two or four presentations than shown here."

vertising,"⁷ where he shows the number of inquiries received by quarter-page, half-page, full-page, two-page, and three-page advertisements.

His results show the total number of insertions of the advertisements of each size, the total number of inquiries, the advertising cost, and the cash returns. We are interested here primarily in the average number of inquiries per insertion. Obviously, Shryer's results do not indicate the actual memory value of the advertisements, though his displays must have been remembered to a certain extent to have obtained any responses at all. Naturally, also, many persons must have remembered the advertisements who did not write to him. His book, however, is one of the few places that the writer knows of where accurate, practical data may be obtained. His figures indicate the actual efficiency of his advertisements and because of this fact, it will be instructive to include his material here. His results, reduced to ratios of the average number of inquiries per insertion, follow:

	Quarter	Half	Full	2-Page	3-Page
P. 171-5.....	1.00	1.46	2.22	—	—
P. 190.....	1.00	1.60	2.27	1.01	4.17
Average.....	1.00	1.53	2.25	1.01	4.17

The first three of these ratios are quite trustworthy, depending as they do on 109 insertions of quarter-page advertisements, 79 insertions of the half-page, and 91 insertions of the full-page. It is interesting to note that the ratios, if we except the one representing the two-page value, vary approximately as the 1.7 root of the space occupied by the advertisement. It seems probable, everything considered, that the value of space varies somewhere between the 1.35 root and the square root of the space occupied, depending upon the conditions under which the experiment is performed. The most probable value is in the neighborhood of the 1.7 root. This statement holds for both memory value and actual efficiency in pulling replies.

The problem of the frequency in insertion of the advertisement is the next one which needs discussion. A comparatively slight amount of work has been done on this point, so the facts are not so definitely known. A summary of the experiments which have been performed will disclose the available data.

Strong's⁸ results show the ratios for one, two, and four presenta-

⁷ Shryer, W. A. "Analytical Advertising," pages 171-175, 190.

⁸ Strong, E. K. *Psychol. Rev.*, Vol. 21, page 146.

tions to be 1.00:1.25:1.62. Our results with duplicated advertisements give these ratios: 1.00:1.49:2.57. The average of the two is 1.00:1.37:2.10. It will be seen that these values are somewhat lower than those obtained for increase in size of the advertisements. It seems to be pretty well proved, then, that size is a more important factor from the standpoint of memory than is frequency of insertion where the repeated advertisements are exact duplicates.

A comparison will again be made with the practical results which are obtained by working over the figures given by Shryer.⁹ He gives a large number of figures showing the results of consecutive advertising. The number of inquiries received from the first, second, and so on up to the seventh insertion of the advertisement, are given. Since both the number of insertions of the advertisement and the resulting number of inquiries were so irregular, they were all reduced to ratios and the ratios averaged. The records for classified advertisements were not considered, for it is generally admitted that there is a considerable difference in the attitude which persons take towards the two kinds, classified and display, the former appealing primarily to those who are already interested in the proposition. It is rather amusing that if one takes Shryer's results as they stand, they prove the existence of cumulative value, the very thing which they were supposed by him to disprove.

In working out his results, the writer has added together the results of consecutive insertions of the advertisement, thus showing the total number of inquiries pulled by the first insertion alone, by the first two, by the first three, etc. The figures, reduced to ratios, follow:

	Number of Insertions						
	1	2	3	4	5	6	7
Inquiries	1.00	2.01	3.03	4.33	5.23	6.58	7.84

These figures are to a certain extent untrustworthy and misleading, for out of the 30 or more tables from which they were derived, fully half contained too few figures to be entirely dependable. The 16 tables which contained 100 inquiries or more for the first insertion were considered apart, for it was thought that the greater the number of inquiries, the less relative effect some slight accidental variation would have. The table made up of these ratios follows:

	Number of Insertions						
	1	2	3	4	5	6	7
Inquiries	1.00	2.08	2.78	3.46	4.20	5.64	6.28

⁹ Shryer, W. A. "Analytical Advertising," pages 82-114.

These figures show a lack of cumulative value, except in the case of the second insertion, and this lack is enhanced when we consider another argument of Shryer's.¹⁰ He states that an advertisement which is inserted but once will still pull inquiries during the second, third, and fourth months and backs up his statement by a list of 10 examples. The relative efficiency of an advertisement which has appeared but once is shown for the first, second, third, and fourth months in the following table of ratios:

1	2	3	4
1.00	1.68	1.83	1.94

Taking Shryer's figures as they stand, uncorrected for the piling up effects of one insertion, we find that they are somewhat higher than those obtained by the experimental method with duplicates, as will be indicated by the following table:

	1	2	4
Experimental.....	1.00	1.37	2.10
Shryer.....	1.00	2.08	3.46

If we try to correct his figures roughly by obtaining the ratio of efficiency of the repeated advertisements to the piling up effects of one insertion alone, we obtain the following ratios:

1	2	4
1.00	1.24	2.21

His figures, with correction, show a very close resemblance to those obtained by the experimental method.

On the average, it appears that increased space is more effective than duplication of advertisements, with both the experimental and the practical results, as will appear from the following table:

Experiment.

	Units of Stimulation		
	1	2	4
Size.....	1.00	1.64	2.43
Duplication.....	1.00	1.37	2.10

Practical Test.

	1	2	4
Size.....	1.00	1.53	2.25
Duplication.....	1.00	1.24	2.21

The table is also interesting in that it points out the very close and striking resemblance between the laboratory tests on memory values and the business tests on practical efficiency.

¹⁰ Shryer, W. A. "Analytical Advertising," pages 114-115.

When we consider the effect of varied advertisements rather than duplicates, we find that repetition is a greater factor than increase in size, as the following table will show:

	Once	Twice	4 Times
Quarter page.....	1.00	2.88	5.31
Half page.....	1.00	2.70	3.66
Full page.....	1.00	2.30	3.17
Average.....	1.00	2.63	4.05

These ratios are considerably above those obtained for increase in size of the advertisements, which were 1.00: 1.64: 2.43.

We are also justified in stating that duplication has a much lower memory value than variation. The following table will make this clear:

	Duplication	Variation
1 appearance	1.00	1.00
2 appearances	1.49	2.63
4 appearances	2.57	4.05

This table shows very strikingly that variation possesses a very much greater memory value than duplication.

There are at least two reasons why this should be the case. In the first place, the degree of attention is undoubtedly an important factor. When we see a duplicated advertisement the second time it is relatively uninteresting, consequently the second impression is not as great as the first. But with the variation, there is always the novelty of a new advertisement so that attention may be at its maximum.

In the second place, where duplicates are used but one type of appeal can be successfully employed. This may be for the reader an uninteresting one, consequently he may neglect the advertisement entirely. Where variations are used, however, it is possible to make as many different types of appeal as there are variations in the series. In addition to producing greater attention, variation is more likely to connect the advertisement with the individual's series of interests, thus tending to give it a greater memory value.

Since Shryer's advertisements have been running consistently in a fairly large number of magazines, it is a very probable supposition that those who answered his advertisements had been influenced both by duplications and variations of the advertisements. If such were the case, and we assume it to be, it would be interesting to compare his ratios with our ratios representing an average of the two tendencies. Such a comparison follows:

	Once	Twice	4 Times
Duplication.....	1.00	1.49	2.60
Variation.....	1.00	2.63	4.05
Average.....	1.00	2.06	3.33
Shryer's.....	1.00	2.08	3.46

These figures, which are strikingly similar, show a high degree of correlation between the experimental test of memory and the practical test of efficiency.

SUMMARY.

1. Increasing size gives a higher memory value than increasing the number of repetitions of an advertisement when exact duplicates are used.

2. Variation is about twice as effective as duplication.

3. There is a very close correlation between the memory value of the different forms of presentation of the material and the practical efficiency of the same forms of presentation in pulling inquiries.

HENRY F. ADAMS.

UNIVERSITY OF MICHIGAN.

THE FIELD OF LOGIC

THE volume of the "Encyclopedia of the Philosophical Sciences" recently published gives an accurate rehearsal of the present condition of the science of logic. If there is any direction in the development of logic it seems to be away from the conception of that science as a branch of psychology. Among the papers we find rather less of that peculiar psychology written in terms inherited from the scholastic logic that characterized the literature under the head of logic some years ago. The conception of logic as the science of the empirical process of thought to be dealt with through the categories of Aristotle or their scholastic modifications for a time threatened to leave no room for the traditional formal logic and its modern successor. From this departure logic has been rescued by the mathematicians. As a result of the work of Peano and his followers psychologism has gone out of fashion.

Psychologism has not disappeared from logical writing, however, and there can be found in the present volume very disconcerting traces of its survival which threaten a return. The writers of the volume have approached their task from very different points of view, but there is one respect in which they are agreed, with vary-